

Linear Graphs

Name:

Date:

INQUIRY

A Nanjing taxi charges $C = 2.4d + 11$ yuan. A Berlin taxi charges $C = 2.0d + 3.90$ euro. If you graph both, what story do the lines tell?

Discuss with your partner. Write your initial ideas below:

Key Vocabulary

Term	Definition
$y = mx + c$	Equation of a straight line. m = gradient, c = y-intercept.
Gradient (m)	The steepness/slope. Rise divided by run.
y-intercept (c)	Where the line crosses the y-axis (when $x = 0$).
Parallel	Lines with the same gradient — they never cross.

Part A — Tables of Values

1. Complete a table of values for $y = 2x + 3$, using $x = -2, -1, 0, 1, 2, 3$. List the coordinates. [3 marks]

2. Complete a table of values for $y = -x + 5$, using $x = -1, 0, 1, 2, 3, 4$. List the coordinates. [3 marks]

Part B — Identifying Gradient and Intercept

3. For each equation, state the gradient (m) and y-intercept (c): (a) $y = 3x + 1$ (b) $y = -2x + 7$ (c) $y = 0.5x - 3$ (d) $y = -x$ (e) $y = 4$ [5 marks]
4. Which of these lines are parallel? Explain how you know. (a) $y = 3x + 1$ (b) $y = 3x - 5$ (c) $y = -3x + 1$ (d) $y = 3x + 10$ [2 marks]

Part C — Real-World Graphs

5. Nanjing taxi: $C = 2.4d + 11$ (yuan). (a) What does the 11 represent? (b) What does the 2.4 represent? (c) Calculate the cost for 5 km, 10 km, and 15 km. (d) A ride cost 59 yuan. How far did you travel? Set up and solve an equation. [5 marks]
6. A Korean phone plan charges $C = 0.05t + 30$ (thousand won, $t =$ texts). A Chinese plan charges $C = 0.08t + 20$. (a) Find the cost of each plan for 100, 200, 500, and 1000 texts. (b) At how many texts do the plans cost the same? (c) Which plan is better for someone who sends 800 texts/month? [5 marks]

7. A German bakery and a Nanjing bakery both sell bread. German price: $P = 0.50n + 2$ euro. Nanjing price: $P = 3n + 5$ yuan (where n = number of loaves). (a) What does the gradient mean in each context? (b) What does the y-intercept mean? (c) Can you directly compare these lines? What problem arises? (Think about currencies.) [4 marks]